Pre-Service Teacher Program Celebrates its 10th Year

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"Science is a journey that takes shapes in our minds to broaden the infinite space that lies around us. Math is the tool that sets the path and technology is the vessel that moves the mind to fill the given space. " -- Unknown

Ten Years ago the National Aeronautics and Space Administration (NASA) Langley Research Center and Norfolk State University (NSU) established the NASA/NSU Pre-Service Teacher Program (PSTP). The Program has been funded continuously since 1996 and has a 2004-05 grant award totaling more than $987,000.

The inspiration for the program came from Mr. Roger Hathaway, Director of University Affairs at NASA Langley in Hampton, VA and Dr. Sandra Proctor, NSU Professor of Social Work on special assignment to the NASA Office of Education. They envisioned a conference for prospective minority secondary school teachers that would focus on enhancing their knowledge in the scientific fields in which they planned to teach. They consulted with Dr. Elaine Witty, the now former Dean of the School of Education at Norfolk State University about this idea. Due to the critical role early learning plays in children's actual scientific knowledge and in their attitudes toward science and mathematics, Dr. Witty felt that the program's focus would best serve K-8 pre-service teachers. Dr. Witty stated:

> "I realized the need to inspire young educators to enjoy math and science in the classroom. We wanted to provide students with more content in science and math, because we want them to truly understand and be able to teach those concepts to their students."

The first component of the PSTP, the Pre-Service Teacher Conference was launched in 1996 in Hampton, VA with 200 participants. It has progressed to a two-day national conference for over 700 participants held annually in February at the Hilton Alexander Mark Center in Alexandria, VA. Conference participants are selected from a network of over 100 Historically Black College Universities, Tribal Colleges and Universities, Hispanic Serving Institutions, and majority institutions serving a large population of minority students. An overwhelmingly large number of these pre-service teachers become in-service teachers in underrepresented rural and urban areas. The conference provides students and faculty advisors with an array of general sessions with outstanding guest speakers; interactive workshops with educators, scientists, and researchers;

networking opportunities; and educational exhibits. Students also participate in a Career Day and compete in a Poster Session on teaching mathematics and science using technology in grades K-8.

In order to provide more in-depth mathematics, science, and technology experiences than could be provided to students at the PSTP Conference, the first Pre-service Teacher Institute (PSTI) was established at NASA Langley in the summer of 1996. Pre-service teachers spend two-weeks in an intensive and engaging session where they are exposed to problem-based learning (PBL) and mathematics, science, and technology enrichment activities led by an outstanding instructional staff. Pre-service teachers work in teams, interface with NASA personnel, and tour NASA facilities while learning to incorporate NASA's cutting-edge research into lesson plans for elementary and middle school students. Each institute hosts 20-25 students from the pool of conference participants. At the end of the two-week session, groups of pre-service teachers team teach a PBL lesson to children from local schools. They earn three college credits for their work. Today, there are Pre-service Teacher Institutes held at five other NASA Centers - Ames, Marshall, Johnson, Stennis, and Kennedy. The Institute has become a scholarly educational program for pre-service teachers in mathematics, science, and technology, the only such program in the nation.

Past PSTP participants, Anika Washington and Maisha Holmes, are program advocates who have taken the mission to heart. Ms. Washington, a senior at Cheyney University in Pennsylvania who plans to work in the Philadelphia School District, says:

> "The PSTP has enabled me to see the future of education and learning to effectively teach math and science to children in a non-traditional way."

Featured in the most recent NASA Langley newsletter, Ms. Holmes, a 2002 Institute participant, and now a teacher in Captain John Elementary School in Hampton, VA stated:

> "I want to empower other teachers. Too often teachers are afraid to teach math and science because they don't know creative ways to present the information. The Institute helps to calm those fears. Sharing my experiences with pre-service teacher participants during the summer Institute has given me the opportunity demonstrates to the participants strategies they can use with children so they will get excited about math and science. The robotics lesson with both the pre-service teacher participants and the 4^{th} and 5^{th} grade students was an exciting way to explore simple machines."

The PSTP has transformed partcipants' perceptions of science, mathematics, and education for the classroom. It has also provided opportunities for some PSTP students to participate in other NASA programs. Anika Washington, Maisha Holmes, and Gamaliel Cherry were selected to participate in the NASA Langley Aerospace Research Summer Scholars program (LaRSS). "It's quite incredible to see that you had no idea on how your life was going to change," Washington said. "You are given this opportunity to come

back and to continue to receive support from PSTI instructors and other NASA educational staff to help plan the next institute. It is just great to see how education is being supported by such an established and influential agency. You just feel proud to be an educator." Cherry, now a graduate student in Instructional Technology at Old Dominion University and a participant in the NASA Langley Graduate Student Researchers Program, said:

> "The Pre-Service Teacher Program opened doors to a new horizon of educational possibilities for my future classroom application. After completion of the Institute, I became overwhelmingly interested in instructional technology, and was able to nurture the roots fostered from the NASA resources made available to me as a result of the Institute. I can truly say that the PSTP has a profound impact on the course my life has taken, and I am truly thankful for those who have made the program possible."

As evidenced by the statements above, the long standing partnership between NASA Langley's Office of Education and Norfolk State University's School of Education and most recently the School of Science and Technology has been enormously successful in its mission to educate pre-service teachers in often-intimidating subjects: mathematics and science. It is unique among the NASA education programs. The program has acquainted minority pre-service teachers and their professors with innovative science and mathematics pedagogy. The specialized curriculum developed through this partnership seeks to improve the nation's mathematics and scientific literacy at the elementary and middle school levels through teacher development. The curriculum was developed and implemented over a period of several years and utilizes the best of emerging technologies and NASA's unique array of science resources.

There is a major need to sustain the vitality of the PSTP. In that regard, the PSTP has established partnerships with private foundations, professional associations, NASA Headquarters, National Science Foundation, and other federal agencies. These partnerships have generated both in-kind and direct funding to support the Conferences and/or Institutes. Currently, partnerships in place include: National Science Teachers Association (NSTA) and National Education Association (NEA). Other partnerships are being aggressively pursued with various national foundations and corporations.

Successful implementation of the national space exploration program will depend upon how well the nation's youth are prepared to meet the challenge. It will be their early encounters with teachers who are knowledgeable and excited about mathematics, science, and technology that will be the driving force for promoting their interests in these critical areas. It will be the classroom teacher who must be ready "to inspire the next generation of explorers…" NASA Langley, in collaboration with Norfolk State University, has exhibited great foresight and vision in focusing its resources on those individuals who will provide them with the next generation of scientists, mathematicians, engineers, and technocrats - **K-8 PRE-SERVICE TEACHERS**. This work will continue at the PSTP 10th Anniversary Conference scheduled for February 16-19, 2005. Dr. Jonetta Coles, President of Bennett College, will be the keynote speaker.